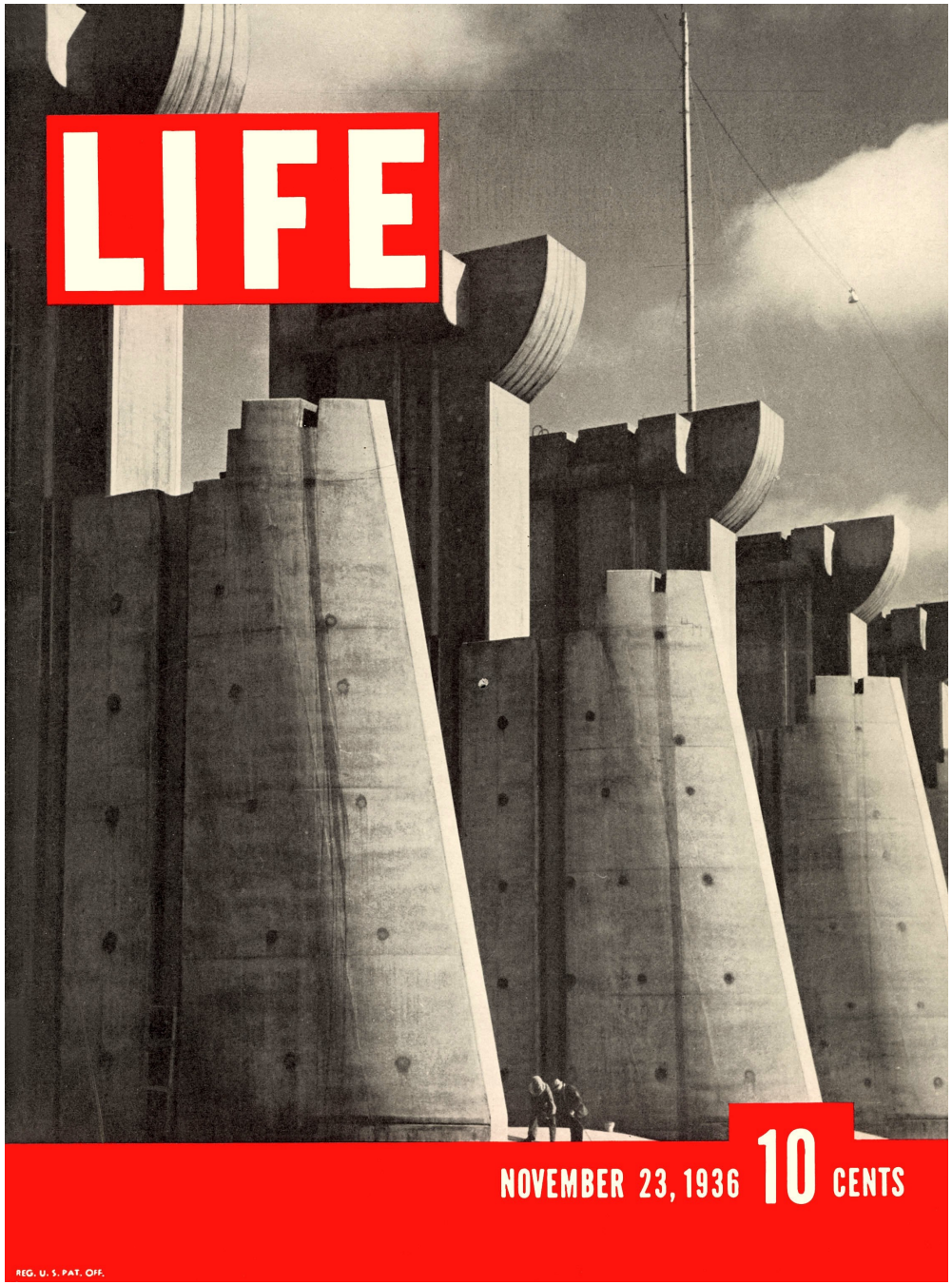


USACE Planning Conference
10 May 2006

Recreation and other Developments within USACE Flood Control Lands

By Laila Berre
Dam Safety Program Manage
Northwestern Division

Fort Peck Dam, Montana

Historic Flood on 30-31 May 1935, 24 inches of rainfall in 5 hours.

Authorized by the Flood Control Acts of 1941 and 1944.

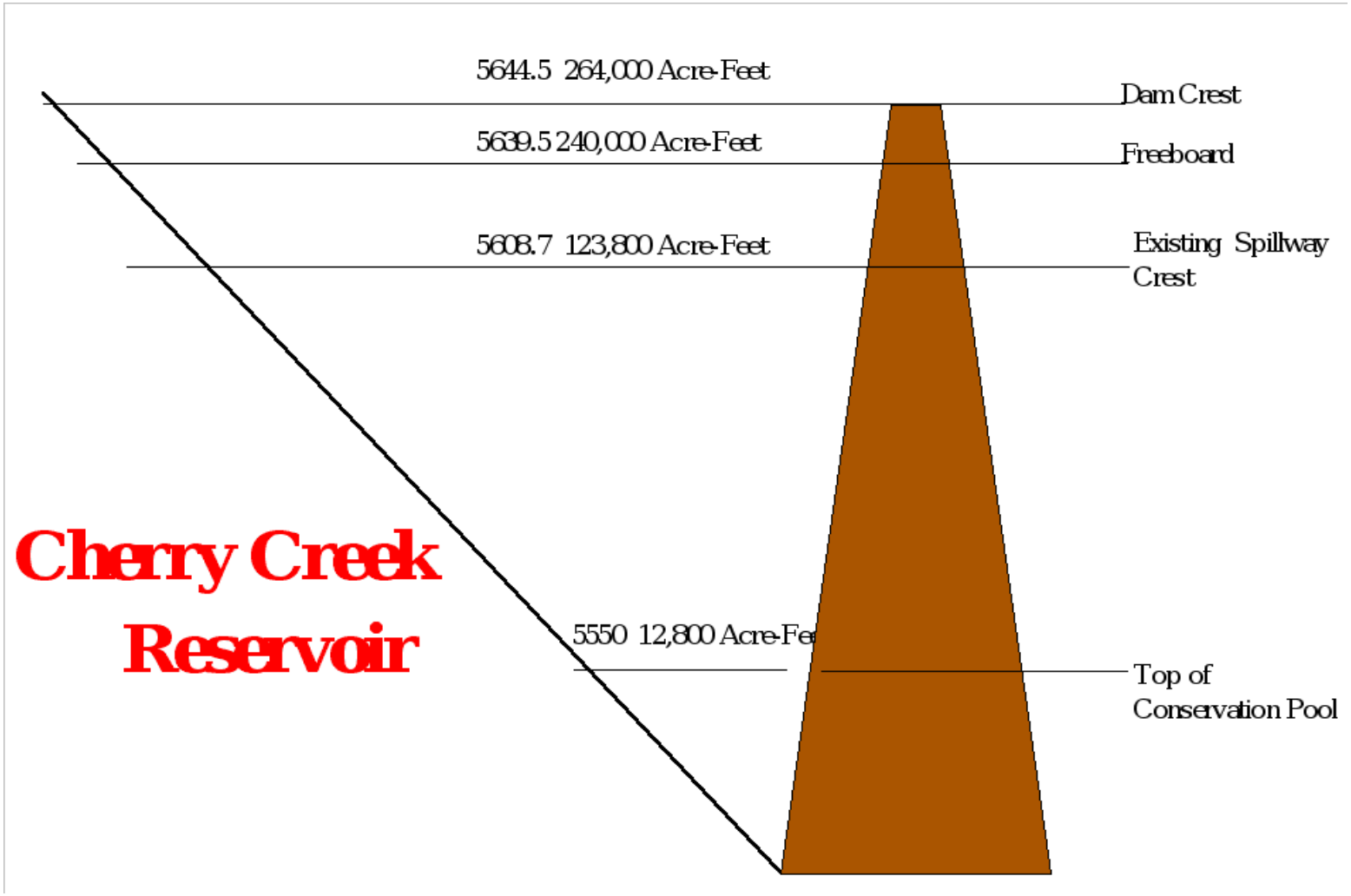
Construction Completed in 1950.

Maximum pool to date was Elev. 5565.8 feet on 03 June 1973.
Spillway Elev. is 5608.7 feet.

Cherry Creek Dam, Denver

6
5-21-30 CHERRY CREEK LAKE

Cherry Creek Dam Elevations



My Thoughts:

- **The public is not always aware that Congress authorizes Corps Dams for flood control, up to the Probable Maximum Flood.**
- **Lots of demand for recreation opportunities in urban areas.**
- **Need to consider Recreation Proposals against Operational requirements for the full range of design flood storage and discharge conditions.**

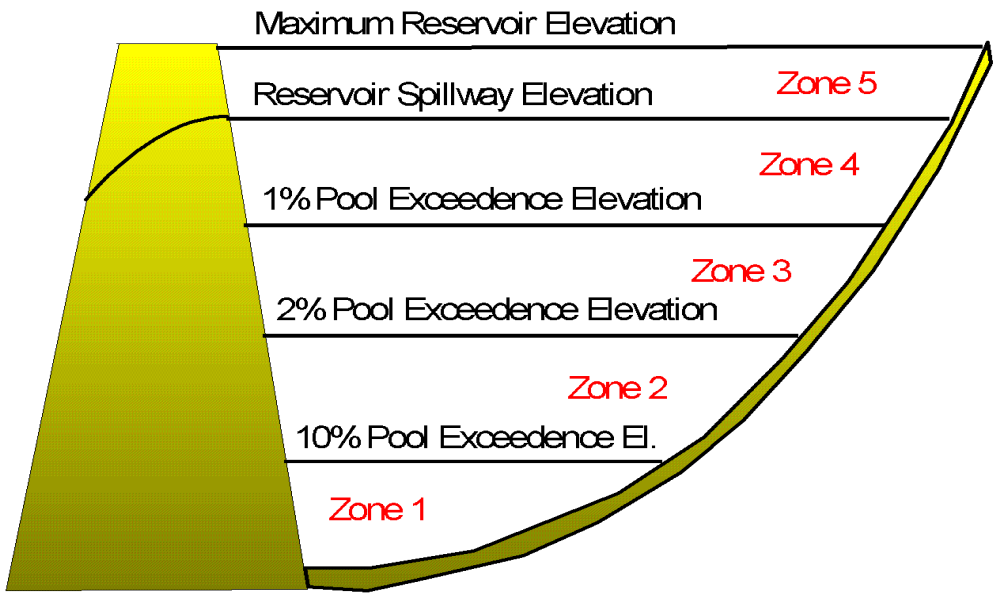
See CECW-ZA Guidance: "Recreation Development *Policy for Outgranted Corps Land", 06 Dec. 2005.*

- **Requires evaluation of recreation development proposals by a district team, consisting minimally of Real Estate and Operations.**
- **Approval authority rests with the District Commander.**
- **Must be consistent with project purposes and the Project Master Plan.**

A good start, but also need to consider…

- **Public and Operational safety during flood events.**
- **Frequency of pool elevations, relative to land use.**
- **Impacts to storage volumes.**
- **Potential release of hazardous materials.**
- **Floating debris that could damage outletworks and spillways, potentially impacting flood discharge capability.**

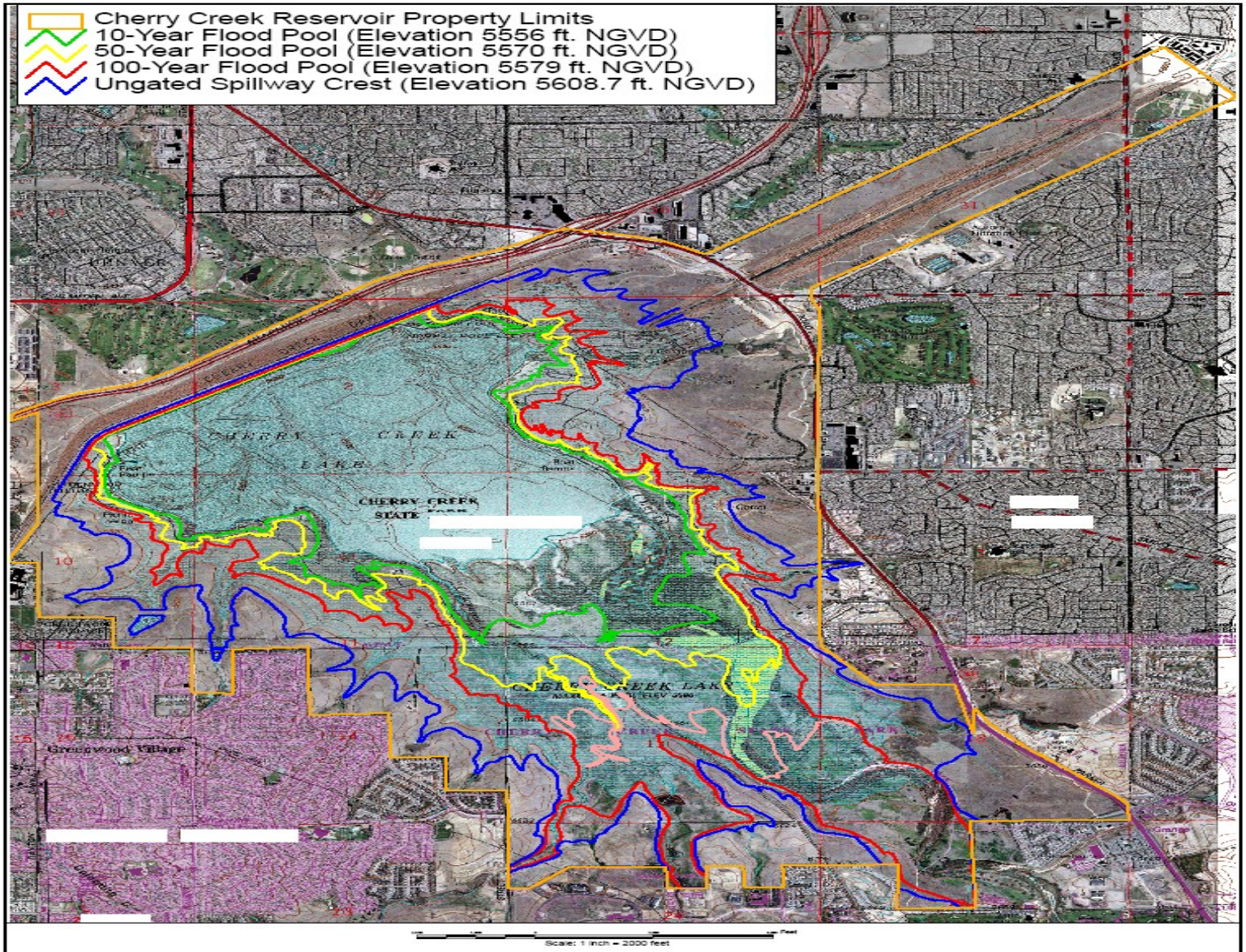
Reference NWD Regulation 1110-2-5 “LAND DEVELOPMENT GUIDANCE AT CORPS RESERVOIR PROJECTS”



Zone	Frequency Range	Development Constraints	Acceptable Land Uses
1	Up to the 10 % exceedence pool	Subject to frequent flooding, prolonged inundation, sedimentation, and wave erosion. Flood insurance is required for all insurable structures in Zones 1-5.	Structures are not allowed. Recreation and/or nature trails and open recreational fields are acceptable. Generally, camping facilities, primitive or modern, are prohibited. Camping facilities can be considered on a case-by-case basis. An evacuation plan is required for all recreational activities located in Zones 1-5.
2	10% exceedence pool to the 2 % exceedence pool	Subject to frequent flooding, periods of inundation, sedimentation, and wave erosion. Flood insurance is required for all insurable structures in Zones 1-5.	Larger structures are generally prohibited. All land uses considered acceptable in Zone 1. In addition, open floodable, wet flood-proofed structures and field facilities that are functionally dependent on close proximity to water are allowed. Portable concession stands, trails, shade and picnic shelters, backstops, goalposts, fishing piers, etc. are examples considered acceptable. Camping facilities can be considered on a case-by-

Zone	Frequency Range	Development Constraints	Acceptable Land Uses
3	from the 2% exceedence pool to the 1% exceedence pool	Subject to periodic flooding, sedimentation, and wave erosion. Flood insurance is required for all insurable structures in Zones 1-5.	All land uses considered acceptable in Zone 2. In addition, closed floodable, wet flood-proofed structures that are functionally dependent on close proximity to water with portable contents are considered acceptable. Larger structures that are functionally dependent on close proximity to water can be considered on a case-by-case basis. All structures and field facilities must be related to authorized project purposes. Camping facilities, primitive or modern, are allowed. An evacuation plan is required for all public

Zone	Frequency Range	Development Constraints	Acceptable Land Uses
4	1% exceedence pool to the spillway crest elevation	Subject to infrequent flooding, sedimentation, and wave erosion. Flood insurance is required for all insurable structures in Zones 1-5.	All land uses acceptable in Zone 3. In addition, closed floodable, wet flood-proofed structures are permitted that are related to authorized project purposes. An evacuation plan is required for all recreational activities located in Zones 1-5.
5	Spillway crest to 1) maximum reservoir level or 2) to maximum elevation of Corps real estate interests, whichever is lower elevation	Subject to very infrequent flooding, sedimentation, and wave erosion. Flood insurance is required for all insurable structures in Zones 1-5.	All land uses considered acceptable in Zone 4. All structures related to authorized project purposes are permitted. An evacuation plan is required for all recreational activities located in Zones 1-5. The evacuation plan must include people in

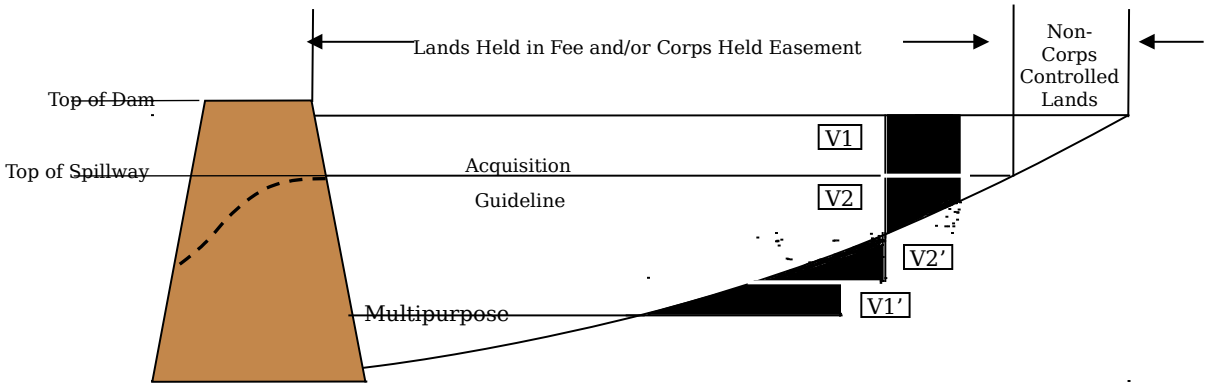

Cherry Creek Reservoir Property Limits
10-Year Flood Pool (Elevation 5556 ft. NGVD)
50-Year Flood Pool (Elevation 5570 ft. NGVD)
100-Year Flood Pool (Elevation 5579 ft. NGVD)
Ungated Spillway Crest (Elevation 5608.7 ft. NGVD)
CHERRY CREEK
LAKE
CHERRY CREEK
STATE
Greenwood Village
Scale: 1 inch = 2000 feet

US Army Corps
of Engineers

Cherry Creek Dam and Reservoir
Arapahoe County, Colorado
Flood Hazard Delineation

Figure 1

Projects entirely on Corps controlled lands



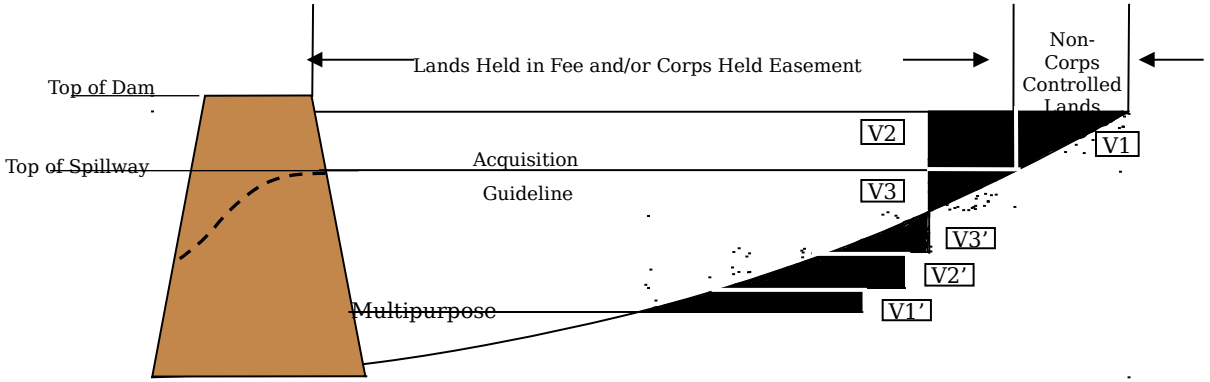
Note: Whenever possible the elevation of excavated fill is always at or below the added fill.

V1 & V2: Volume of fill added to reservoir due to new development.

V1' and V2': Volume of fill required to be removed from reservoir to mitigate for V1 & V2.

Figure 2

Projects that straddle Corps and non-Corps controlled lands



Note: Whenever possible the elevation of excavated fill is always at or below the added fill.

V2 & V3: Volume of fill added to reservoir over Corps controlled lands due to new development.

V1: Volume of fill that the new development would add to reservoir over non-Corps controlled lands.

V2' & V3': Volume of fill removed from reservoir to mitigate for V2 & V3.

V1': Volume of fill that developer should be encouraged to remove from reservoir lands.

Recommendations:

- **Coordinate with Sponsors, and discuss operational and safety concerns - upfront.**
- **Establish a multi-functional PDT to review Development Proposals, including Dam Safety and Water Management experts.**
- **Limit the types of structures allowed in reservoirs and discharge areas, based on elevation / pool frequency.**
- **Consider construction details. Cut and fill volumes must not cause any property to be flooded more frequently than before the development was in place.**

Recommendations, continued:

- **Consider the full range of authorized operation conditions.**

- **Do not approve development proposals which may result in future “pressures” to adjust flood releases to accommodate private interests.**

Questions?

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